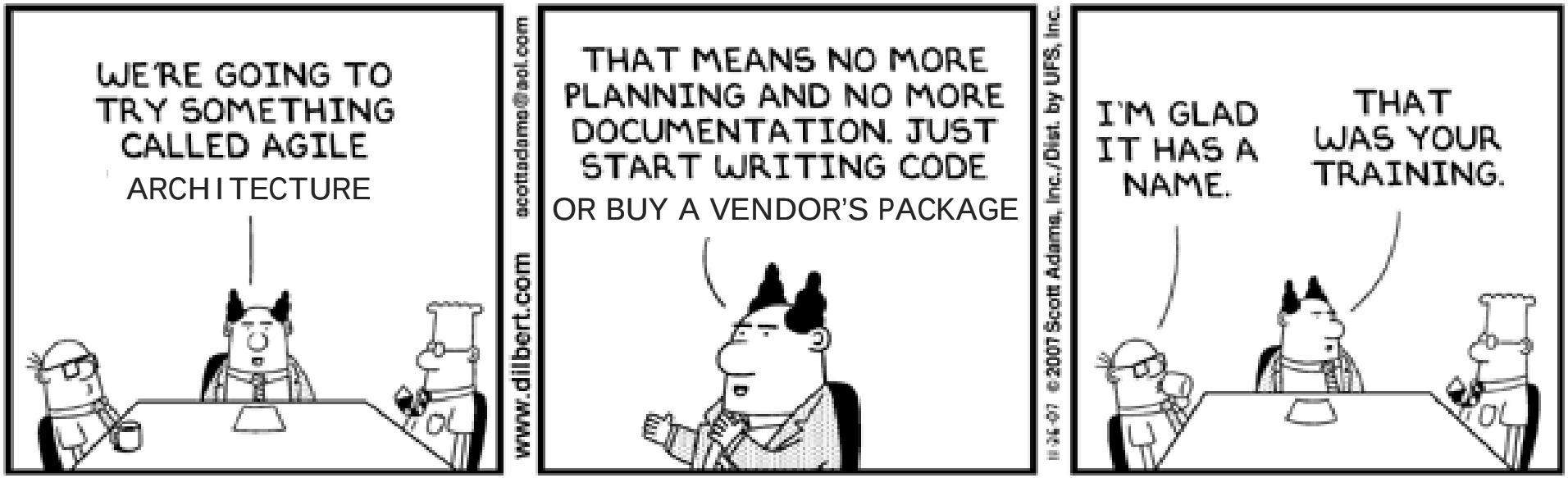
Why is Architecture Important

2012/December/05

Architecture as usually practiced



(Apologies to Mr Adams and my fellow architects)

There is never enough time (or money) to do it right the first time
There is always enough time and money to fix it over and over again
-Anonymous

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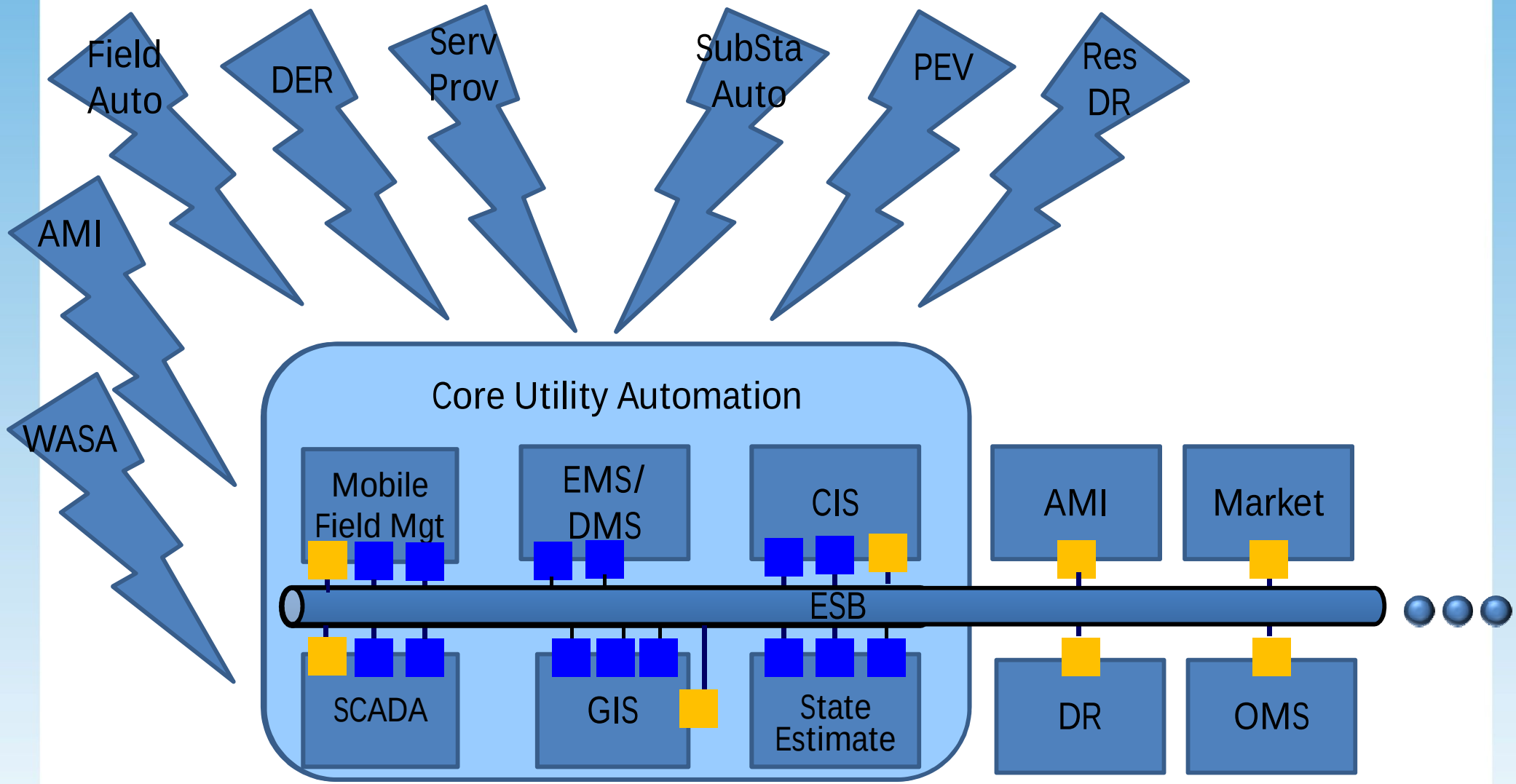
Siloed Implementation Approach



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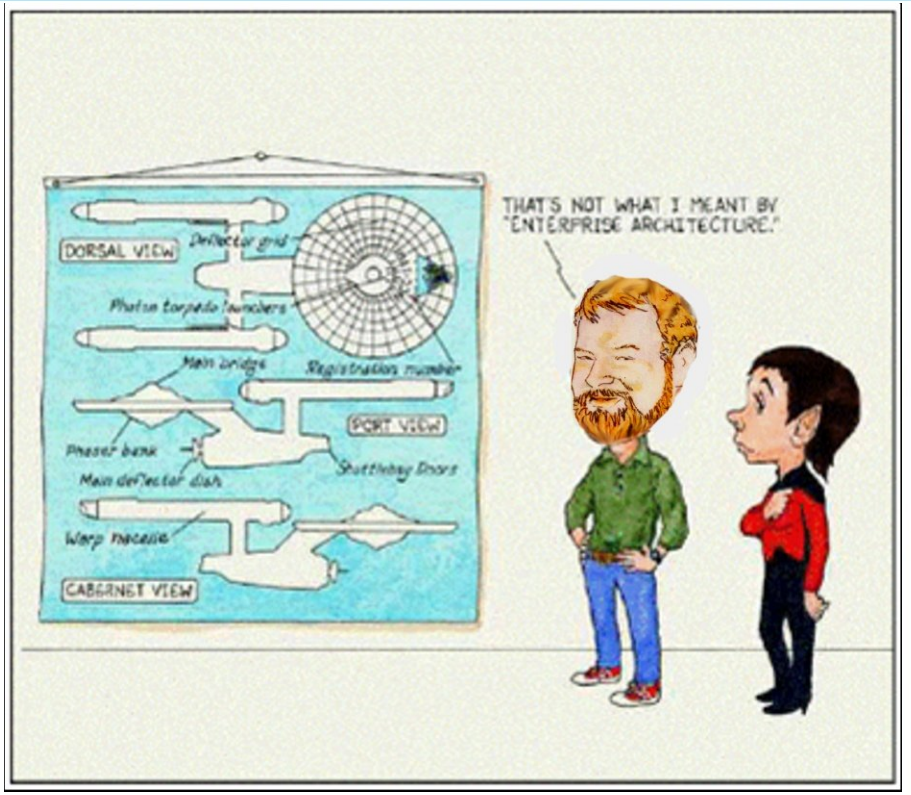
What is (Enterprise) Architecture?

- It starts with the idea that one should plan business processes, technology purchases and development ahead of time
- It is not IT, Systems or Solution Architecture

  and ...
- Here's the important part: the business stakeholders, not technology people, should determine what is needed (the goals/requirements)



Architecture provides an actionable plan to enact Smart Grid as seen from the stakeholder perspective

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Why We Need Architecture

Logical – but … ?

Yes, it's a Kitchen/ Bathroom

First in first out/ Priority of the day

OR

Input

Architectural Process

Output

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Architecture

It's much more than technology

People

- Businesses specify service requirements and service levels
- Activities maximize re-use across business
- Business and ICT jointly model services
- Governance model for services (rollout, policies, etc)

Process

- Design process embraces reuse of existing services
- Embrace standards
- Manage life cycle and evolution of services that support business drivers

Technology

- Tools to jointly (Business and ICT) design and capture service models
- Monitor and manage SLAs
- Enforce policies (e.g. Security)

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Smart Grid Architecture Produces

- Strategic Plans
- Technical Road Maps
- Business processes
- Use Cases
- Reference Models
- Recommended standards
- Migration Plans
- Change Management
- Security and Governance

In short what is required to move from today's state to the stakeholder's goal

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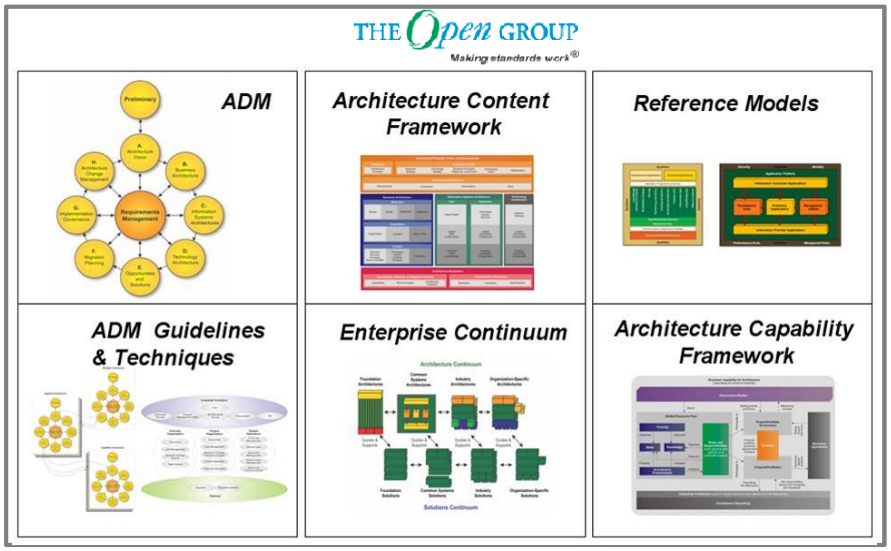
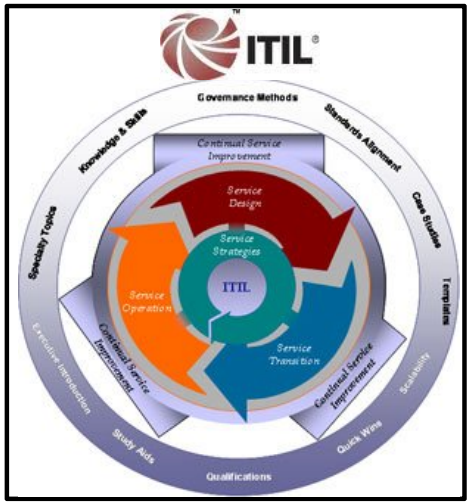
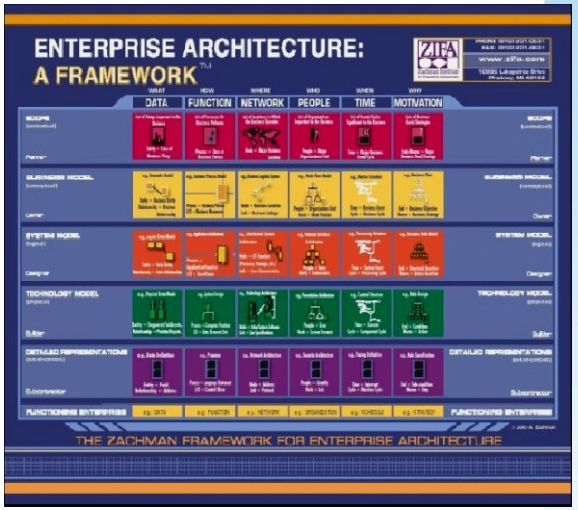
Architecture uses Frameworks

- Including TOGAF*, DoDAF, MoDAF, FEA, Zachman, &c
- They have their own Methodology, Techniques and Tools
- Incorporate Lifecycle maps for Project Management (PMO) and Systems Engineering lifecycles (ITIL)







* The Open Group Architecture Framework

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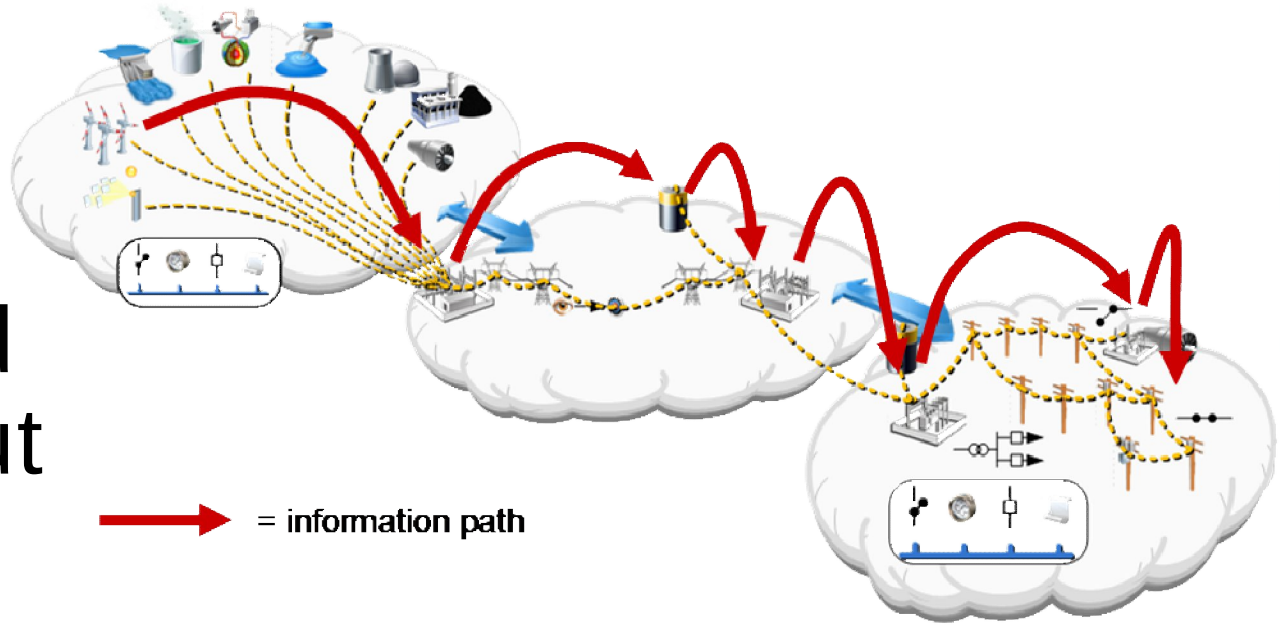
Use Cases

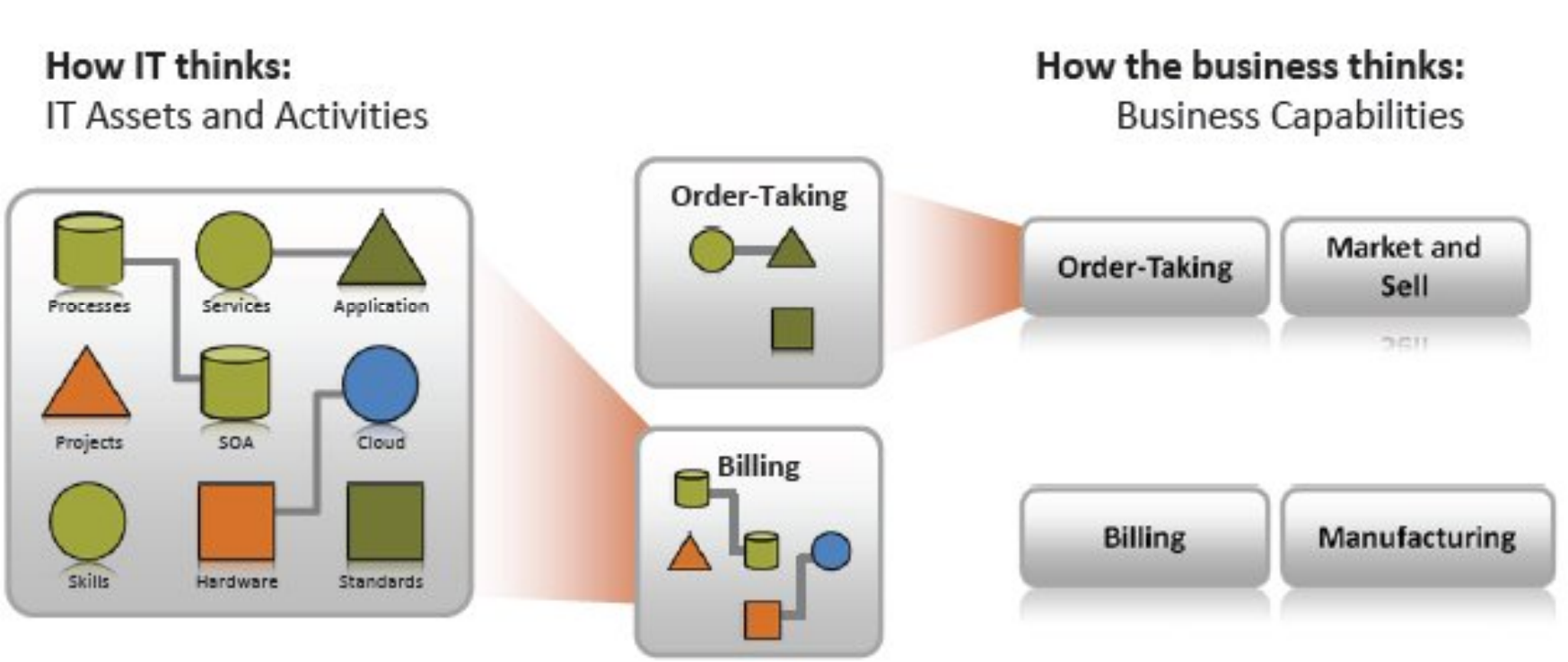
Bridges the gap between business and technologist - Clarifies how a Smart Grid requirement is envisioned to work and provides the overarching:

- Functional requirements
- Non-Functional requirements
- Interfaces
- Sequence
- Actors (roles)

They are used and refined throughout the architectural process



Services focus on how the organization works



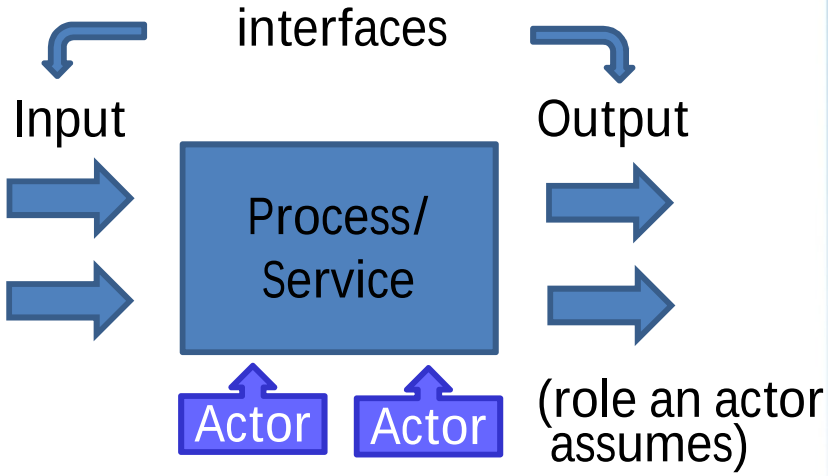
Capability Map
Aligns IT Portfolio with Business Capabilities

Architecture *Service Orientation*
Open Group Definition

- Service orientation is a way of thinking in terms of services and service-based development and the outcomes of services
- A service:

  Is a logical representation of a repeatable business activity that has a specified outcome (e.g., provide weather data, locate fault, dispatch DER)
  - Is self-contained
  - *May be* composed of other services
  - Is a "black box" to consumers of the service
  - An architectural style is the combination of distinctive features in which architecture is performed or expressed.

Simply put:
Services are "black boxes", messages come into them, they work their magic, and resulting message are sent out



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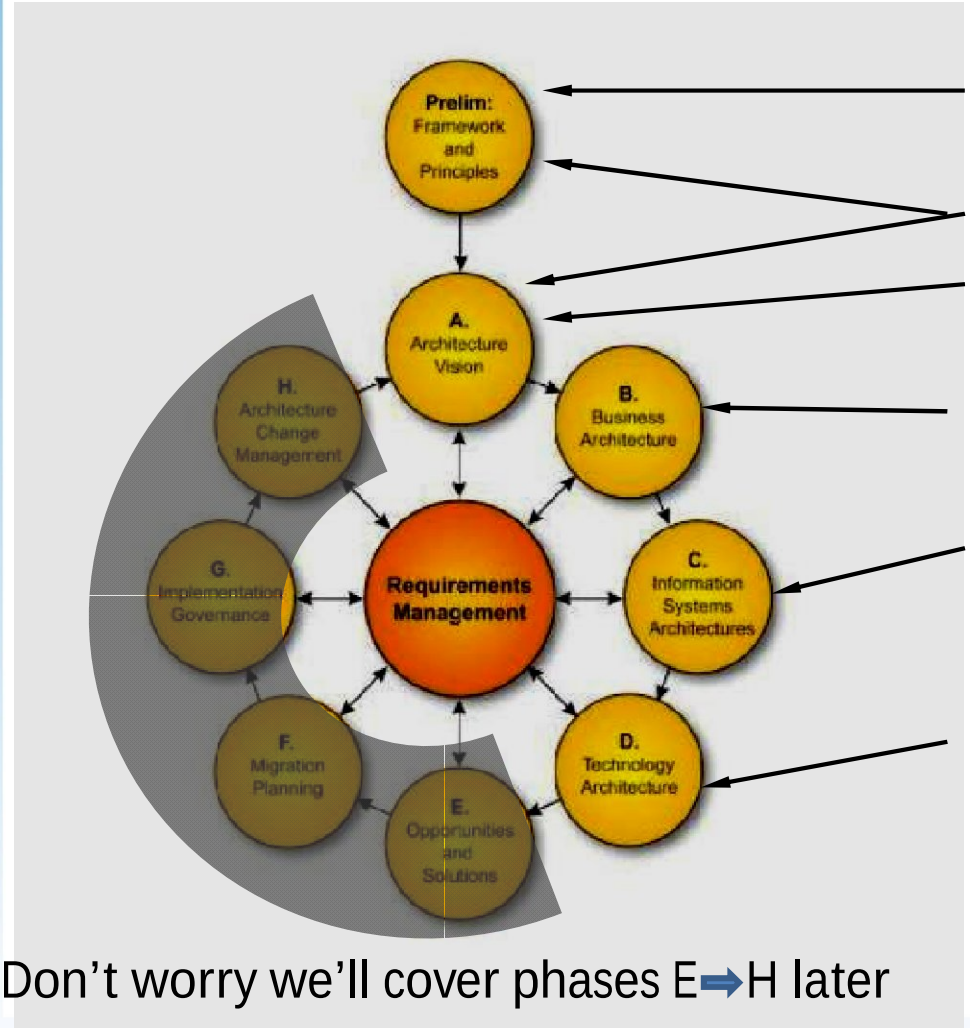
Architecture *Phases*

Rather then trying to "eat an elephant all at once", architecture identifies goals and decomposes them into services that ultimately relate to the physical entities



Don't worry we'll cover phases E➡H later

This breaks-down into:

- Preliminary, What do you have & what are your organization's drivers
- Vision, what goals you trying to achieve
- Requirements, what needs do the goals impose
- Business Services, what *abstracted* services are needed to support a requirement
- Information (or Automation) Services, what *sort* of applications and information models are needed to support the abstracted service
- Technical Service, what is actually performing the service

Plus Cross-Cutting Services:

- Security – How information, processes & infrastructure are protected
- Governance – How oversight is executed

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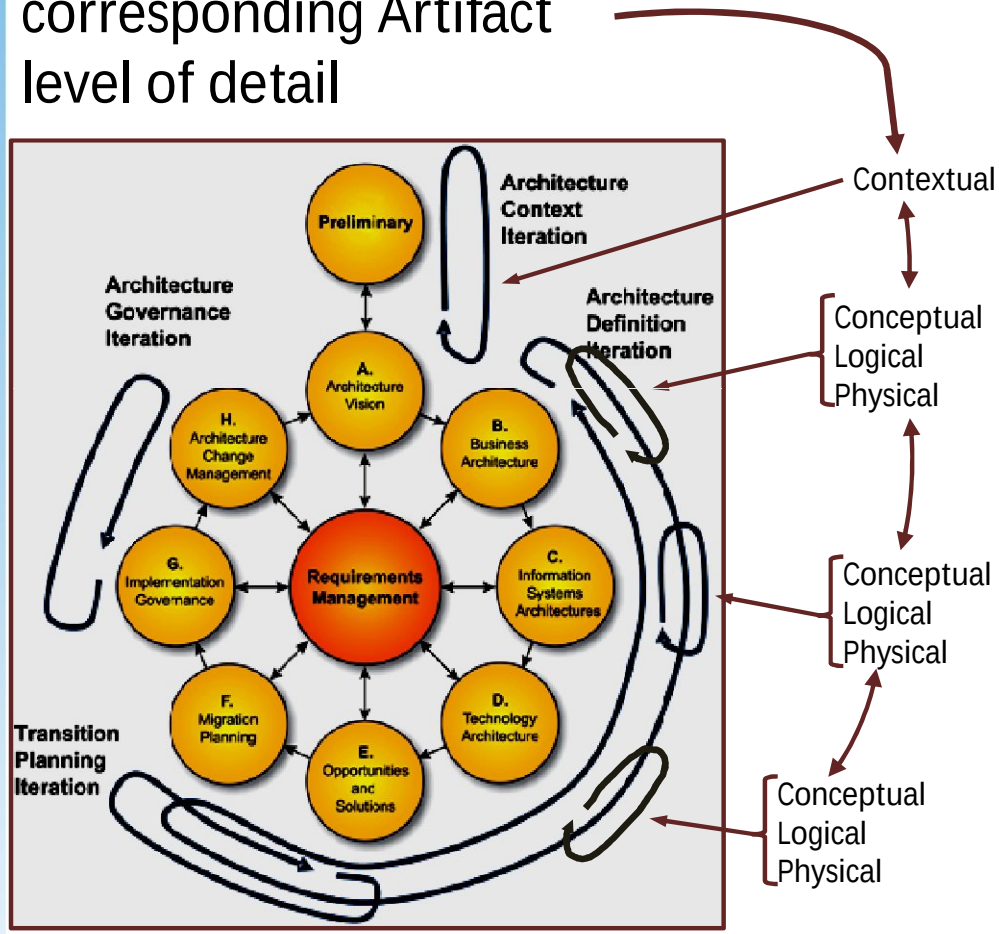
TOGAF Iteration & Architecture layers

TOGAF cycle and corresponding Artifact level of detail



Contextual/Vision

- What are the Goals
- What is the current state

Conceptual

- What it shall accomplish
- What services are required

Logical

- How it shall be accomplished
- How is the architecture structured

Physical

- What resources shall be required

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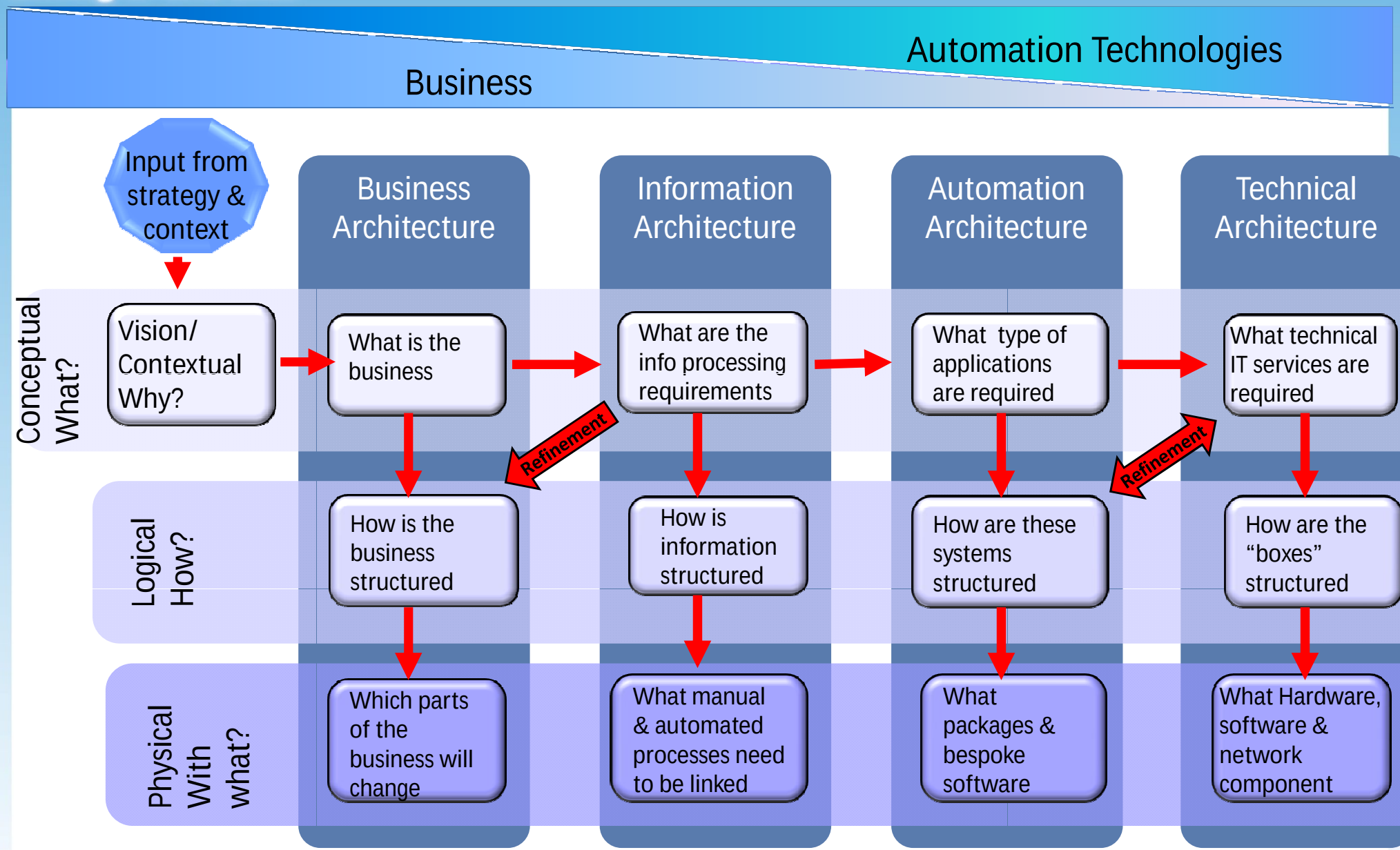
Architecture roadmap



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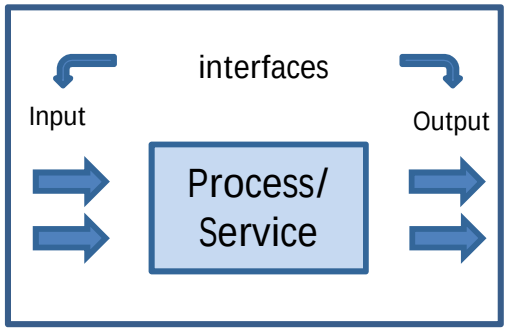
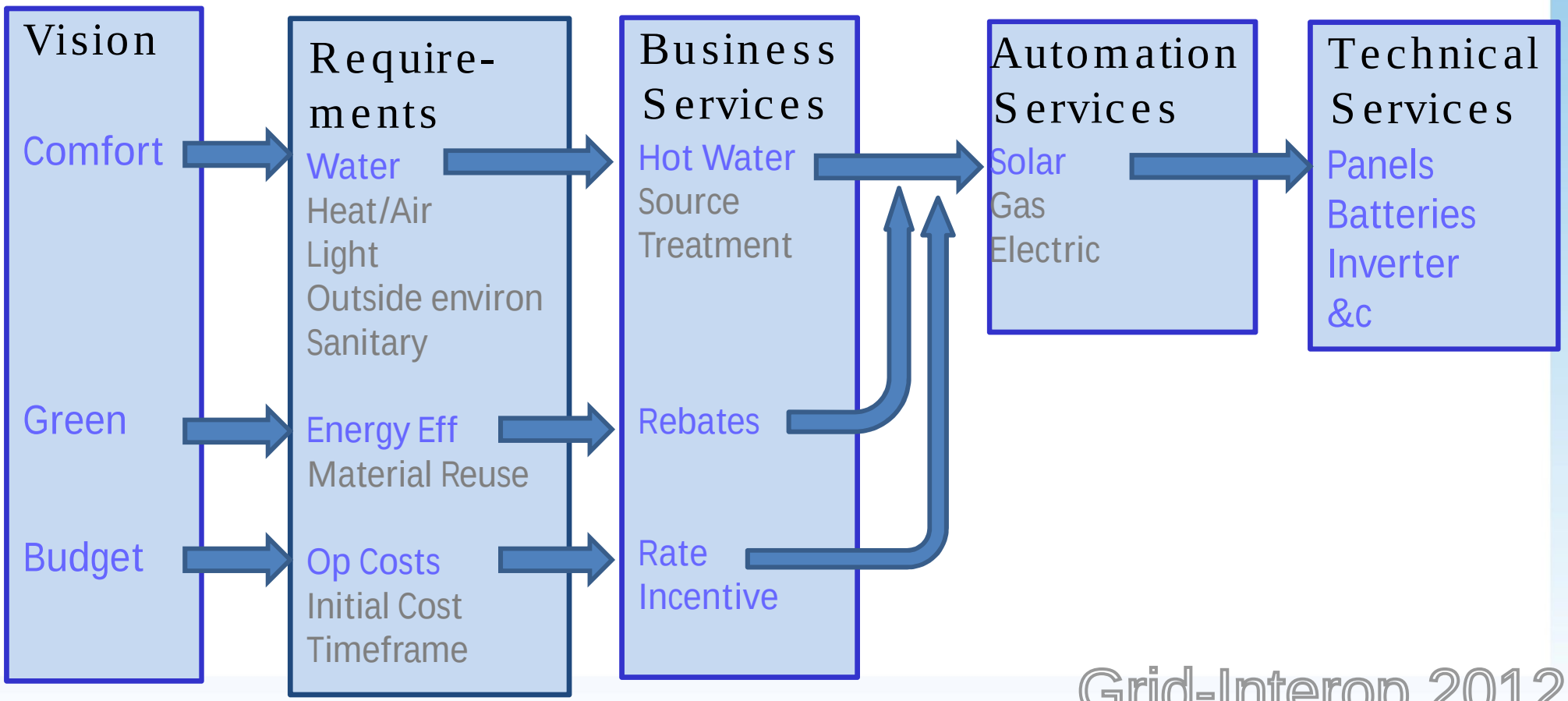
Simple Building Architecture Example

Magic in this case is the ability to infer the options





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Why we need sequence

Sequence ensures the right thing is done in the right order & illuminates alternatives
It's not as easy as it sounds

Impact of no sequence

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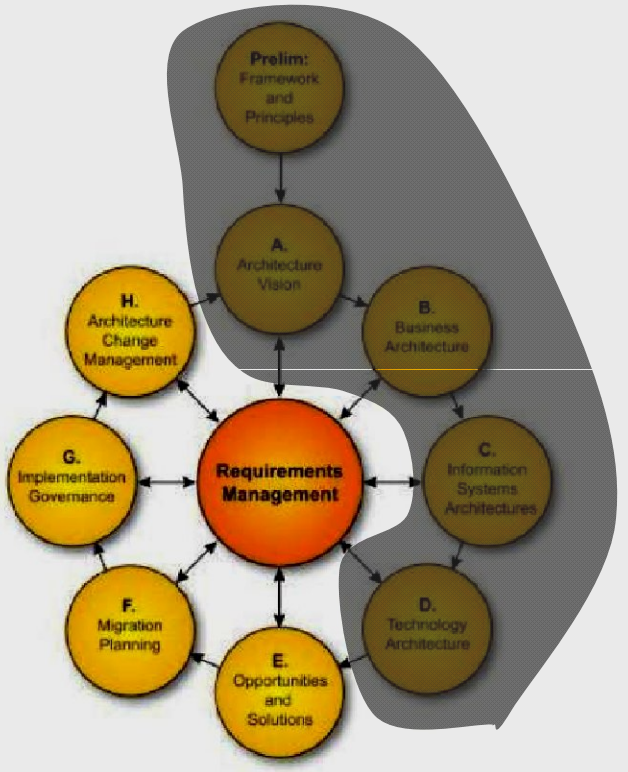
The Rest of the Story

Ok, now we understand what it takes to design a Smart Grid. *Now* we have to implement it, migrate legacy procedures/systems, operate it, handle changes and ensure governance

- Yikes …. Remember the other half of the cycle?
  That's where those areas are handled
- This ensures the architecture stays viable instead of stale
  - Think of this as your "honey-do" list



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Service Orientation shifts the way organizations work

Traditional	Service-Oriention
Designed to last	Designed to change
Tightly coupled	Loosely coupled, agile and adaptive
Siloed and inflexible	Composed of business services
Code-oriented (IT-related)	Process-oriented
Long development cycles	Interactive and iterative cycles
Business unit centered	Business initiative centered
Favors homogeneity	Favors heterogeneity

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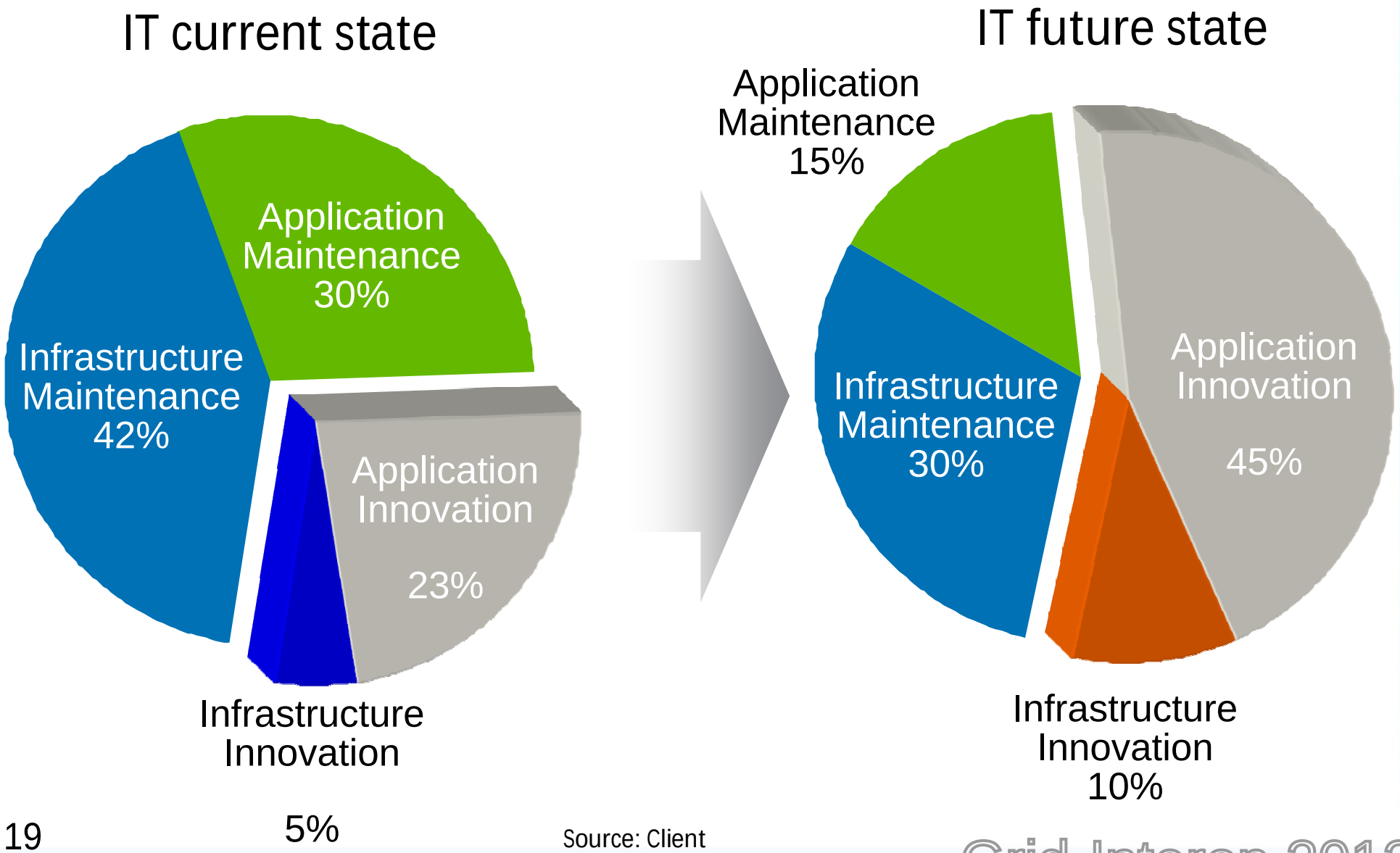
SOA enables the move from maintenance to innovation



Source: Client

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Architecture Aside

- Executives will never ever use architecture models…

  ….but they will always need the outputs

- Provide what they need in a form they like

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Architecture Summary

Enterprise Architecture is a means to:

- Mitigate risk
- Understand how the business operates today and what changes are needed to achieve the business' Smart Grid objectives/goals
- Gain operational efficiencies
- Maximize Capital expenditures
- Bring order to IT delivery - aligning Business Services with the underlying IT Services-Oriented (SOA) foundation

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Questions ?

How does this work?

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Conceptual Architecture

Is Critical for Future-Proofing Interoperability!

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Agenda

- What is Conceptual Architecture
- A simple example of Conceptual Architecture
- Reasons why you should care
- Smart Grid Conceptual Architecture Projects
- Artifacts

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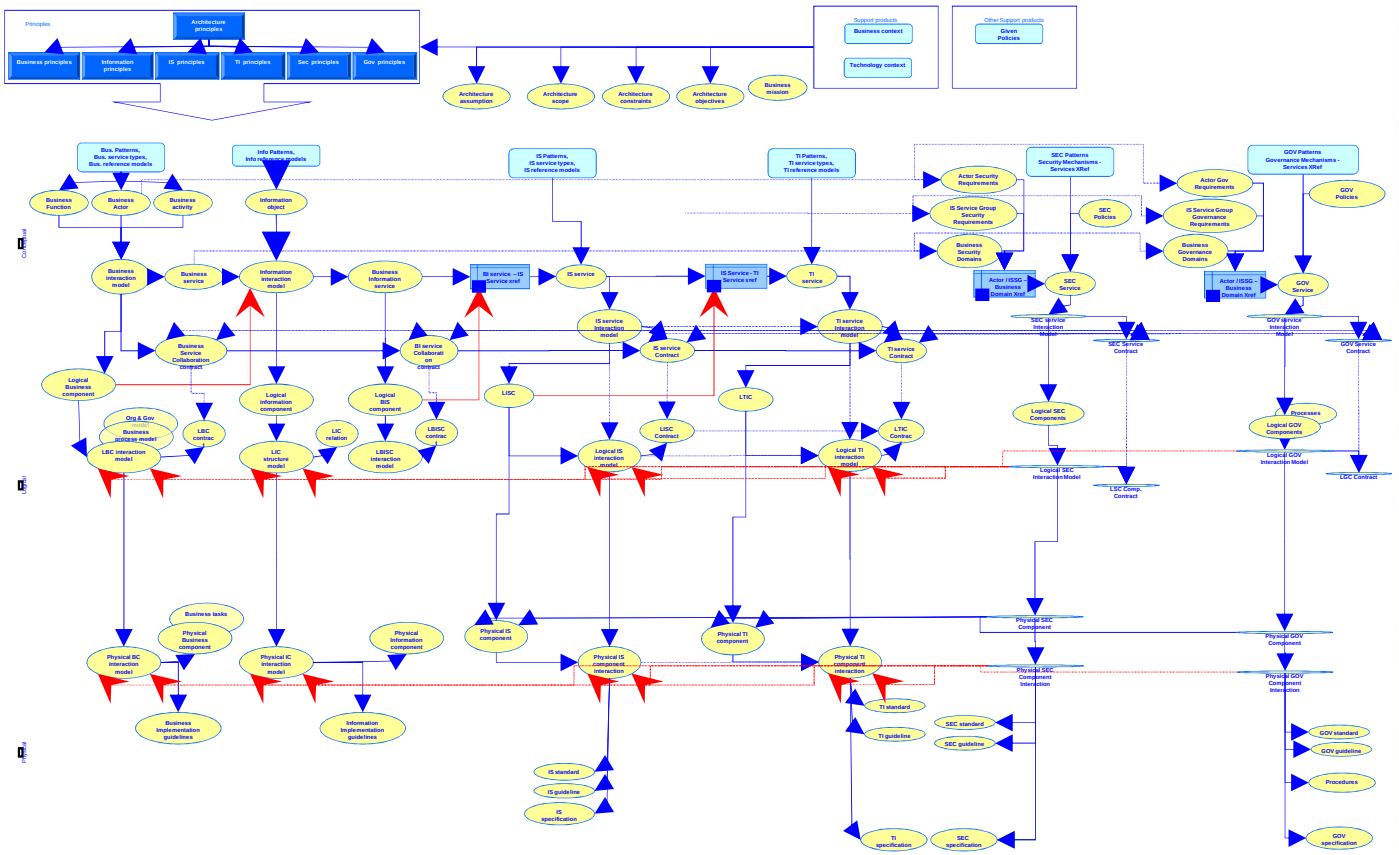
Conceptual	• What are we doing • Services
Logical	• How are we doing it • Components
Physical	• With what are we doing it • Physical products

Conceptual Services

- Business
- Information
- Automation
- Technical
- Security
- Governance



The whole architecture process

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Simple Example

- Order
- Eat
- Pay

- What happens when we play with these?
- Can we do different things with them?

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6 Business Types

Order Pay Eat = Fast Food	Pay Eat = Buffet	Eat Order Pay = Food Tasting Party
Eat = Army Mess or a Soup Kitchen	Order Eat Pay = Restaurant	Pay Order Eat = Mongolian BBQ

Playing with services can be profitable

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Why do I care?

- Defined points of interoperability
- Defined points of communication
- Common interface design
- Standards for points of interoperability
- Simple business re-arrangement

The Poker Deck

- Think of services as a large poker deck
- Business can deal a “winning” hand from the deck, knowing that they fit within the industry framework
  - Their business can be completely unique
  - The industry understands by the services chosen what the interoperability issues are

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Three Key Industry Projects

- European M490
- SGIP Architecture Working Party
- China National Grid Architecture Project

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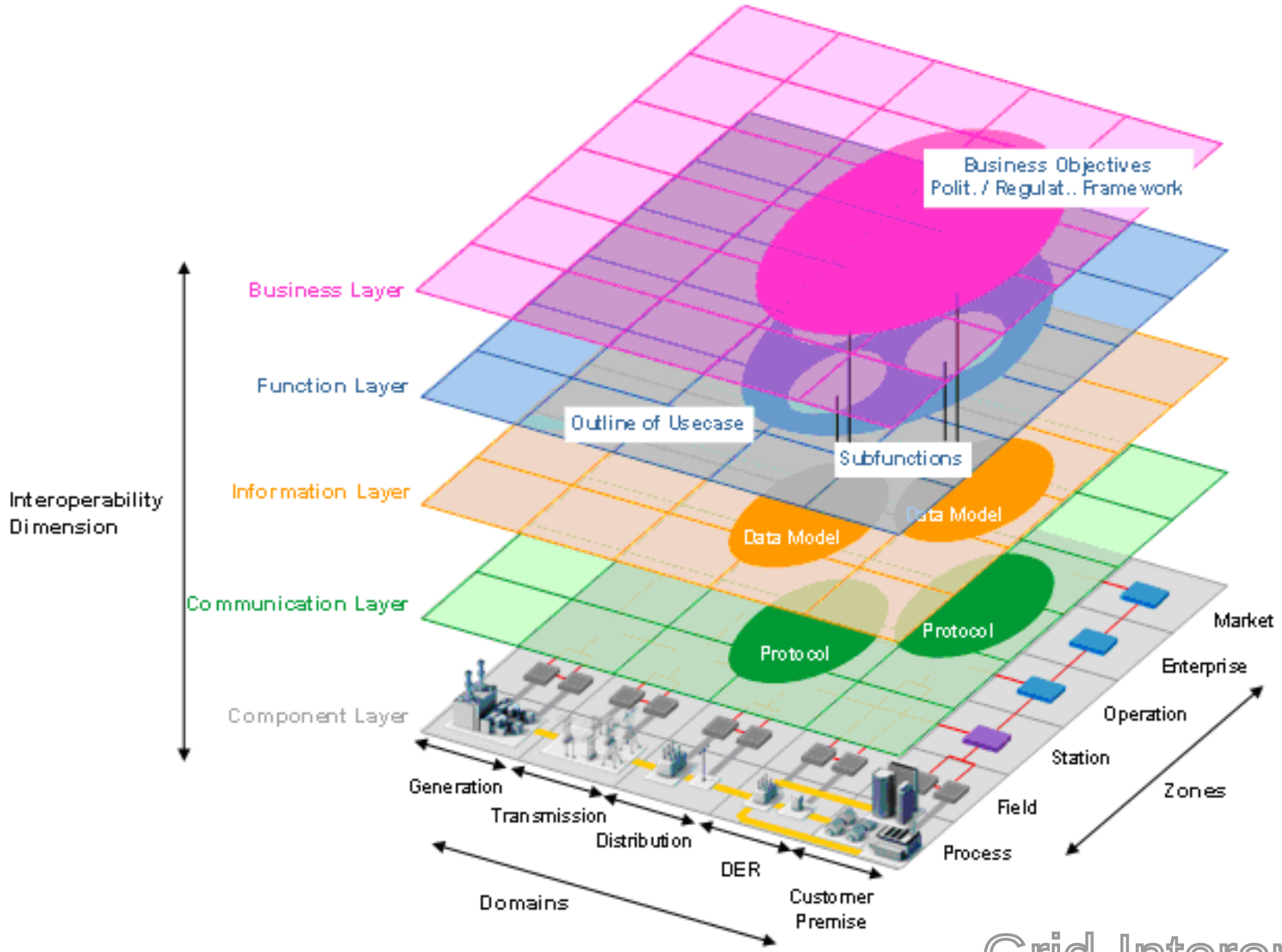
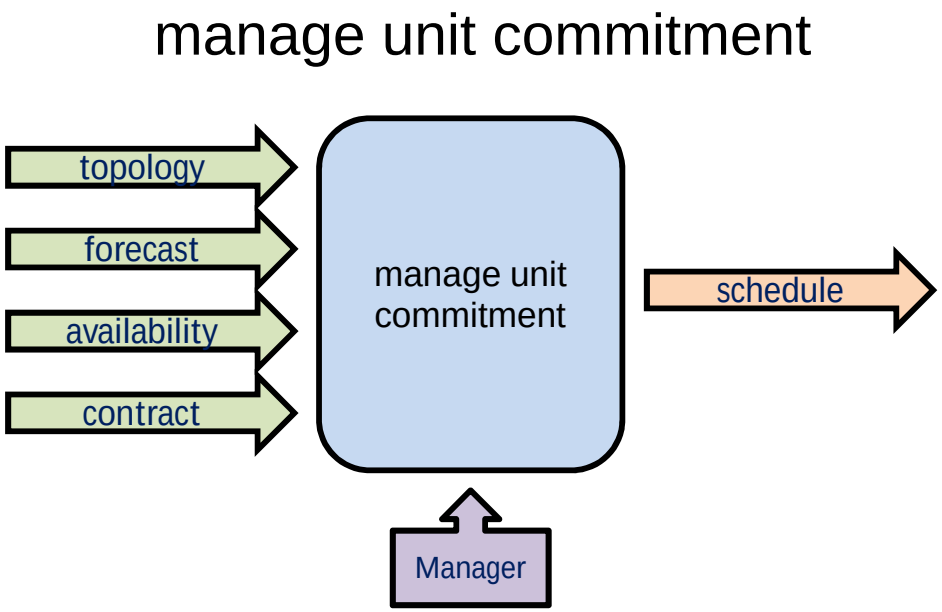
M490 – Use Case Evaluation Framework



SGAC “Deck”



Each Service has:

- A name
- A description
- Inputs
- Outputs
- Actors
- Traceability to UC

- The deck is based on the universe of Use Cases
- It has been tested in a number of architecture projects
- It continues to evolve
- New use cases are being added to the library
- The services make deciding what interfaces to build much easier
- It makes deciding which standards to accelerate much easier

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Questions?

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Thank You!